REMARKS

The Examiner rejected claims 27 and 31 under 35 U.S.C. §102(b) as allegedly being anticipated by Reimann (U.S. Patent No. 4,663,497).

The Examiner rejected claim 37 under 35 U.S.C. §102(e) as allegedly being anticipated by Curcio et al. (U.S. Patent No. 6,504,111).

The Examiner rejected claims 36 and 38-39 under 35 U.S.C. §102(b) as allegedly being anticipated by Lloyd (U.S. Patent No. 3,601,523).

The Examiner rejected claim 37 under 35 U.S.C. §103(a) as allegedly being unpatentable over Curcio et al. (U.S. Patent No. 6,504,111) in view of Towle et al. (U.S. Patent No. 6,555,906).

The Examiner rejected claims 21-24 under 35 U.S.C. §103(a) as allegedly being unpatentable over Lloyd ('523) in view of Watanabe et al. (U.S. Patent No. 5,319,159).

The Examiner rejected claim 28 under 35 U.S.C. §103(a) as allegedly being unpatentable over Reimann (497) in view of Lloyd (U.S. Patent No. 3,601,523).

The Examiner rejected claims 29-30, 32 and 35 under 35 U.S.C. §103(a) as allegedly being unpatentable over Reimann (497) in view of Curcio et al. (U.S. Patent No. 6,504,111).

Applicants respectfully traverse the §102 and §103 rejections with the following arguments.

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35 U.S.C. §102: Claims 27 and 31

The Examiner rejected claims 27 and 31 under 35 U.S.C. §102(b) as allegedly being anticipated by Reimann (U.S. Patent No. 4,663,497).

Applicants respectfully contend that the Examiner has not persuasively demonstrated that Reimann anticipates claim 27, as explained next.

As a first example why the Examiner has not persuasively demonstrated that Reimann anticipates claim 27, the Examiner cites cladding 24a of FIG. 2a of Reimann for the "conductive pad" of claim 27. Yet the Examiner cites the conductive material 38 of FIG. 5 of Reimann as the conductive element of claim 27, even though the cladding 24a does not exist in FIG. 5 inasmuch as the cladding 24a was removed in the transition from FIG. 2a to FIG. 3 (see Reimann, col. 3, line 62).

As a second example why the Examiner has not persuasively demonstrated that Reimann anticipates claim 27, the Examiner cites the conductive material 38 of FIG. 5 of Reimann as the conductive element of claim 27, wherein the upper portion of the conductive material 38 extends above the surface of the laminate as required by claim 27. Yet, the Examiner cites the conductive pad (which was removed and doesn't exist) as circumscribing the upper portion of the conducive material 38 in FIG. 8 of Reimann. However, the upper portion of the conductive material 38 that the Examiner identified in FIG. 5 does not exist in FIG. 8 inasmuch as the upper portion of the conductive material 38 was removed by a sanding process in the transition from FIG. 5 to FIG. 6 (see Reimann, col. 4, lines 8-10).

In summary, the Examiner has not identified a single structure in Reimann that teaches all of the features of claim 27. Instead, the Examiner has improperly combined different structures

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shown in different Figures of Reimann.

Based on the preceding arguments, Applicants respectfully maintain that Reimann does not anticipate claim 27, and that claim 27 is in condition for allowance. Since claim 31 depends from claim 27, Applicants contend that claim 31 is likewise in condition for allowance.

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35 U.S.C. §102: Claim 37

The Examiner rejected claim 37 under 35 U.S.C. §102(e) as allegedly being anticipated by Curcio et al. (U.S. Patent No. 6,504,111).

Applicants respectfully contend that Curcio does not anticipate claim 37, because Curcio does not teach each and every feature of claim 37. For example, claim 37 does not teach "wherein the bonding layer comprises conductive metal filled epoxy". The Examiner alleges that layers 32A, 32B, and 32C, as described in col. 3, lines 27-57 of Curcio comprise metal filled epoxy. In response, Applicants respectfully contend that col. 3, lines 27-57 of Curcio does not disclose that layers 32A, 32B, and 32C comprise metal filled epoxy. In fact, "epoxy" and "metal filled epoxy" are not even mentioned in col. 3, lines 27-57 of Curcio.

Based on the preceding arguments, Applicants respectfully maintain that Curcio does not anticipate claim 37, and that claim 37 is in condition for allowance.

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35 U.S.C. §102: Claims 36 and 38-39

The Examiner rejected claims 36 and 38-39 under 35 U.S.C. §102(b) as allegedly being anticipated by Lloyd (U.S. Patent No. 3,601,523).

With respect to claim 36, Applicants respectfully contend that Lloyd does not anticipate claim 36, because Lloyd does not teach each and every feature of claim 36. For example, claim 36 does not teach "applying a compressive pressure to the portion of the at least one end of the conductive element, wherein the compressive pressure applied to the portion of the at least one end of the conductive element forms a contact pad extending beyond a surface of the laminate".

The Examiner argues that Lloyd discloses: "applying a compressive pressure to the at least one end of the conductive element (column 3, lines 20-24) whereby the compressive pressure applied to the portion of the at least one end of the conductive element (15) forms a contact pad (35, 37, column 3, lines 37-38) extending beyond a surface of the laminate (10)".

In response, Applicants contend that the portion of the at least one end of the conductive element 15 that extends beyond the surface of the laminate10, to which the compressive pressure is applied as shown in Fig. 2 of Lloyd, is removed (as shown in Fig. 3 of Lloyd) before the alleged contact pad (35, 37) is formed. Therefore, the compressive pressure disclosed in Lloyd does not form the alleged contact pad (35, 37), as required in claim 36.

Based on the preceding arguments, Applicants respectfully maintain that Lloyd does not anticipate claim 36, and that claim 36 is in condition for allowance.

With respect to claim 38, Applicants respectfully contend that Lloyd does not anticipate claim 38, because Lloyd does not teach each and every feature of claim 38. For example, claim 38 does not teach "impacting the surface of the laminate by the conductive element, wherein said

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impacting forms a hole in the laminate such that the entire conductive element provided in the providing step becomes embedded within the hole". In Lloyd, the hole in the laminate 10 is not formed by the alleged impacting. In fact, the hole is provided in the laminate 10 prior to the step of impacting the surface of the laminate by the conductive element (see Lloyd, Fig. 1 and col. 2, lines 70-72).

In addition, the entire conductive element 15 provided prior to the projecting and impacting steps does not become embedded in the hole, since a portion of the conductive element 15 is removed as shown in Fig. 3 of Lloyd.

Based on the preceding arguments, Applicants respectfully maintain that Lloyd does not anticipate claim 38, and that claim 38 is in condition for allowance. Since claim 39 depends from claim 38, Applicants contend that claim 39 is likewise in condition for allowance.

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35 U.S.C. §103: Claim 37

The Examiner rejected claim 37 under 35 U.S.C. §103(a) as allegedly being unpatentable over Curcio et al. (U.S. Patent No. 6,504,111) in view of Towle et al. (U.S. Patent No. 6,555,906).

Applicants respectfully contend that claim 37 is not unpatentable over Curcio in view of Towle, because Curcio in view of Towle does not teach or suggest each and every feature of claim 37. For example, Curcio in view of Towle does not teach or suggest the feature of: "a bonding layer between the first and second laminates such that the contact pads of the first and second conductive elements are electrically connected, wherein the bonding layer comprises conductive metal filled epoxy".

The Examiner admits: "Curcio et al. does not disclose the bonding layer (36) made of conductive metal filled epoxy". The Examiner argues: "Towle et al. shows a laminated connector as shown in figures 1-8 having a bonding layer (116, column 3, line 55) made of metal filled epoxy (column 3, lines 5558).... It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ a bonding layer made of metal filled epoxy in the structure of Curio et al, as taught by Towle et al, for the purpose of providing an electrical bonding connection and reducing heat between the laminated structure." In response, Applicants respectfully contend that the Examiner's argument for modifying Curcio with the alleged teaching of Towle is not persuasive.

A first reason why the Examiner's argument for modifying Curcio with the alleged teaching of Towle is not persuasive is that the Examiner has admitted that Curcio already teaches the required electrical bonding connection. See office action, page 3, item 3 ("Curcio et al. discloses a structure as shown in figures 4-7 comprising: ... a bonding layer (32A; 32B; 32C,

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column 3, lines 27-56) between the first and second laminates, such that the contact pads (22A, 22C) are electrical connected").

A second reason why the Examiner's argument for modifying Curcio with the alleged teaching of Towle is not persuasive is that Curcio does not disclose heat transfer as being a problem or an issue, and one of ordinary skill in the art would have no reason to think that there is a heat transfer issue in Curcio that needs to be addressed.

Based on the preceding arguments, Applicants respectfully maintain that claim 37 is not unpatentable over Curcio in view of Towle, and that claim 37 is in condition for allowance.

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35 U.S.C. §103: Claims 21-24

The Examiner rejected claims 21-24 under 35 U.S.C. §103(a) as allegedly being unpatentable over Lloyd ('523) in view of Watanabe et al. (U.S. Patent No. 5,319,159).

Applicants respectfully contend that claim 21 is not unpatentable over Lloyd in view of Watanabe, because Lloyd in view of Watanabe does not teach or suggest each and every feature of claim 21. For example, Lloyd in view of Watanabe does not teach or suggest "applying a compressive pressure to the portion of the at least one end of the conductive element, wherein the compressive pressure applied to the portion of the at least one end of the conductive element forms a contact pad extending beyond the surface of the laminate".

The Examiner argues that "Lloyd discloses ... applying a compressive pressure to the at least one end of the conductive element (column 3, lines 20-24) whereby the compressive pressure applied to the portion of the at least one end of the conductive element (15) forms a contact pad (35, 37, column 3, lines 37-38) extending beyond a surface of the laminate (10)".

In response, Applicants contend that the portion of the at least one end of the conductive element 15 that extends beyond the surface of the laminate10, to which the compressive pressure is applied as shown in Fig. 2 of Lloyd, is removed (as shown in Fig. 3 of Lloyd) before the alleged contact pad (35, 37) is formed. Therefore, the compressive pressure disclosed in Lloyd does not form the alleged contact pad (35, 37), as required in claim 21.

Perhaps the reason that the Examiner has incorrectly analyzed claim 21 is that the Examiner's argument has not correctly tracked the language of claim 21. Claim 21 recites "applying a compressive pressure to **the portion of** the at least one end of the conductive element" (emphasis added). In contrast, the Examiner alleged that "Lloyd discloses ... applying a

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compressive pressure to at least one end of the conductive element".

Based on the preceding arguments, Applicants respectfully maintain that claim 21 is not unpatentable Lloyd in view of Watanabe, and that claim 21 is in condition for allowance. Since claims 22-24 depend from claim 21, Applicants contend that claims 22-24 are likewise in condition for allowance.

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35 U.S.C. §103: Claim 28

The Examiner rejected claim 28 under 35 U.S.C. §103(a) as allegedly being unpatentable over Reimann (497) in view of Lloyd (U.S. Patent No. 3,601,523).

The Examiner argues: "Reimann does not teach the conductive element pressed into the opening of the laminate. Lloyd teaches a laminate (10) having an opening or a hole (14) wherein a conductive element (15) pressed into the opening (14) disclosed in figures 1-6, see column 3.... It would have been obvious to one having ordinary skill in the art at the time the invention was made to have teaching's Lloyd to employ the structure of Reimann in order to provide a low resistance through hole of a multilayer structure."

Applicants are assuming that the Examiner considers the Examiner's arguments for rejecting claim 27 under 35 U.S.C. §102(b) over Reimann to apply to the rejection of claim 28 under 35 U.S.C. §103(a) over Reimann in view of Lloyd aside from the feature of: "an opening in the laminate that the conductive element is pressed into" in claim 28. Accordingly, Applicants respectfully contend that the arguments that Applicants presented *supra* for traversing the rejection of claim 27 are valid arguments why claim 28 is not unpatentable over Reimann in view of Lloyd.

In addition, the Examiner's argument for modifying Reimann by the teaching of Lloyd is not persuasive and is totally unrelated to the issue of why it would be obvious for the structure of claim 28 to have an opening in the laminate that the conductive element is pressed into.

Based on the preceding arguments, Applicants respectfully maintain that claim 28 is not unpatentable over Reimann in view of Lloyd, and that claim 28 is in condition for allowance.

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35 U.S.C. §103: Claims 29-30, 32, and 35

The Examiner rejected claims 29-30, 32 and 35 under 35 U.S.C. §103(a) as allegedly being unpatentable over Reimann (497) in view of Curcio et al. (U.S. Patent No. 6,504,111).

As to claim 29, the Examiner alleges that "Reinman et al. discloses all of the limitations of the claimed invention, except for a top surface of the conductive pad coplanar with a top surface of the upper portion of the conductive element." The Examiner appears to be relying on the Examiner's arguments for rejecting claim 27 under 35 U.S.C. §102(b) over Reimann to apply to the rejection of claim 29 under 35 U.S.C. §103(a) over Reimann in view of Curcio aside from the particular feature of: "wherein a top surface of the conductive pad is coplanar with a top surface of the upper portion of the conductive element" in claim 29. Accordingly, Applicants respectfully contend that the arguments that Applicants presented *supra* for traversing the rejection of claim 27 are likewise valid arguments as to why claim 29 is not unpatentable over Reimann in view of Curcio.

As to the aforementioned particular feature in claim 29, the Examiner argues: "Curcio et al. shows in figure 3 having a top surface of the conductive pad coplanar with a top surface of the upper portion of the conductive element.... It would have been obvious to one having ordinary skill in the art at the time the invention was made to have teaching's Curcio (figure 3) in the structure of Reinman et al. for the purpose of providing directly electrical contact of a component to a laminate board."

In response to the preceding argument by the Examiner, Applicants respectfully contend that providing direct electrical contact of a component to a laminate board does not require that top surface of the conductive pad be coplanar with a top surface of the upper portion of the

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conductive element. Therefore, Applicants respectfully contend that the Examiner's argument for modifying Reimann with the teaching of Curcio is not persuasive in relation to claim 29.

Based on the preceding arguments, Applicants respectfully maintain that claim 29 is not unpatentable over Reimann in view of Curcio, and that claim 29 is in condition for allowance.

As to claims 30, 32, and 35, the Examiner alleges that "Reinman et al. discloses all of the limitations of the claimed invention, except for part of the upper portion of the conductive element extending above the conductive pad, in direct mechanical contact with a top surface of the conductive pad, and not on the top surface of the conductive pad". The Examiner appears to be relying on the Examiner's arguments for rejecting claim 27 under 35 U.S.C. §102(b) over Reimann to apply to the rejection of claims 30, 32, and 35 under 35 U.S.C. §103(a) over Reimann in view of Curcio, aside from the particular features stated *supra* by the Examiner. In response, Applicants respectfully contend that the arguments that Applicants presented *supra* for traversing the rejection of claim 27 are valid arguments why claims 30, 32, and 35 are not unpatentable over Reimann in view of Curcio.

As to the aforementioned particular feature in claims 30, 32, and 35, the Examiner argues: "Curcio shows in figure 5 that a conductive element (20A) having an upper portion (17) extending above a top surface of a conductive pad (22A) in direct mechanical contact and not on the top surface of the conductive pad.... It would have been obvious to one having ordinary skill in the art at the time the invention was made to have teaching's Curcio (figure 5) in the structure of Reinman et al. for the purpose of providing electrically interconnection structure between layers of a multilayer circuit board."

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In response to the preceding argument by the Examiner, Applicants respectfully contend that providing electrically interconnection structure between layers of a multilayer circuit board does not require having part of the upper portion of the conductive element extending above the conductive pad, in direct mechanical contact with a top surface of the conductive pad, and not on the top surface of the conductive pad. Therefore, Applicants respectfully contend that the Examiner's argument for modifying Reimann with the teaching of Curcio is not persuasive in relation to claims 30, 32, and 35.

Based on the preceding arguments, Applicants respectfully maintain that claims 30, 32, and 35 are not unpatentable over Reimann in view of Curcio, and that claims 30, 32, and 35 are in condition for allowance.

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CONCLUSION

Based on the preceding arguments, Applicants respectfully believe that all pending claims and the entire application meet the acceptance criteria for allowance and therefore request favorable action. If the Examiner believes that anything further would be helpful to place the application in better condition for allowance, Applicants invites the Examiner to contact Applicants' representative at the telephone number listed below.

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